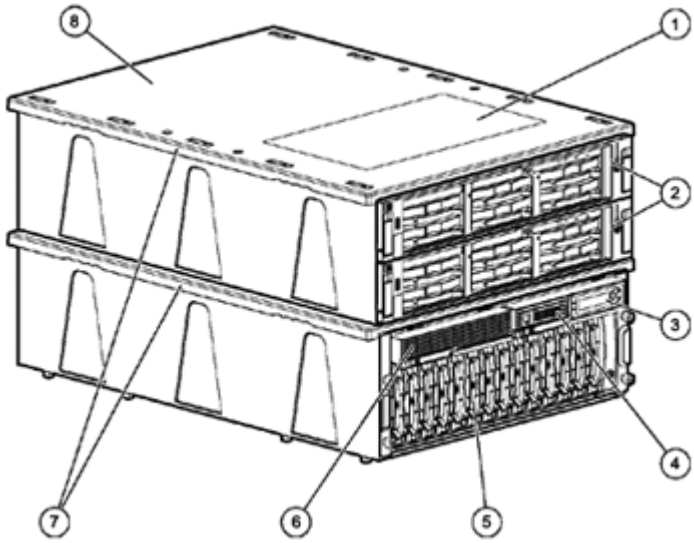
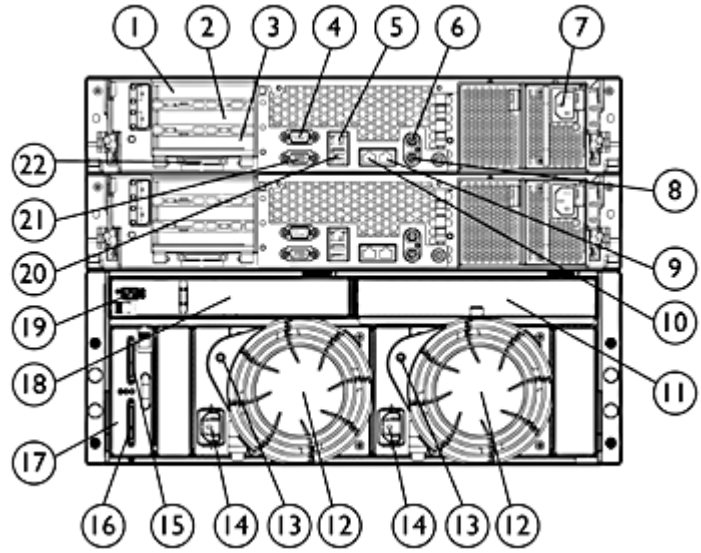
Overview





Front Veiw:

1. Cluster Component Label
2. Two 2U Servers
3. MSA1000 Controller
4. MSA1000 Controller LED
5. 4U HP StorageWorks MSA1000 Shared Storage with fourteen Hot Plug Hard drives Bays
6. Redundant MSA1000 Controller Bay
7. Lifting Rails
8 Configuration Fixture

ProLiant DL380 G4 Rear View:

1. Hot-plug or non-hot-plug PCI-X expansion slot 3, 64 bit/100 MHz, bus B /PCI Express x4 slot 2, bus B
   NOTE: x8 PCI Express cards are supported on the SCSI models and will run at x4 speeds. SAS models do not support PCI Express cards.
2. Hot-plug or non-hot-plug PCI-X expansion slot 2, 64 bit/100 MHz, bus B / PCI Express x4 slot 1, bus A
   NOTE: x8 PCI Express cards are supported on the SCSI models and will run at x4 speeds. SAS models do not support PCI Express cards.
3. Non-hot-plug PCI-X expansion slot 1, 64 bit/133 MHz, bus A
4. Serial connector
5. iLO connector
6. Mouse connector
7. Power cord connector
8 Keyboard connector
9. NIC 1 connector
10. NIC 2 connector
20. USB connectors
21. Video connector
22. VHDCI SCSI connector (port 1)
    NOTE: This feature applies only to SCSI models.

MSA1000 Rear View:

11. Blank panel (when hot-pluggable options installed)
12. Power supply/blower assemblies

13. Power supply/blower assembly indicators
14. AC power cord connectors
15. SCSI Port A connector
16. SCSI Port B connector
17. SCSI I/O Module with an integrated Environmental Monitoring Unit (EMU)
18. Fibre Channel I/O Module
19. 2-Gb Small Form Factor Pluggable Transceivers (SFP)

What's New

- Features (2) HP ProLiant DL380 G4 Intel® Xeon® 3.6 GHz, 2MB cache Servers
- Redundant Fans Standard in servers (for 3.6 GHz, 2MB servers)
- Configure-To-Order (CTO) capability is offered by HP inside sales

At A Glance

The DL380 G4 Packaged Cluster with MSA1000 combines the power and reliability of the ProLiant DL380 G4 server with the high performance and scalability of the MSA1000 storage system. In standard configurations, the DL380 G4 Packaged Cluster with MSA1000 offers the convenience of pre-installed storage and server components in a single package. The innovative shipping box simply opens and allows for quick setup while leaving the servers and storage readily accessible in the Packaged Cluster 8U fixture. Colorful configuration and setup guides quickly explain the process of connecting storage, networking and power cables. Once initial setup has been completed, the packaged cluster may be quickly re-packaged for deployment at another site or facility, or simply removed from the 8U packaged cluster fixture and installed in an HP rack with the enclosed universal rail kits.

The MSA1000 combines the array controller shelf and the drive shelf, which holds up to fourteen 1" universal disk drives in a single 4U rackmount cabinet. More storage can be easily deployed with the addition of up to two HP StorageWorks MSA30 disk enclosures with space for forty-two drives giving maximum storage capacity of 12 TB when using the new 300 GB drives. The packaged cluster may be used with Microsoft Windows® Server 2003, Windows 2000, Novell and Linux operating systems for standard and clustered configurations. The performance and scalability of the MSA1000 allows for up to 18 additional ProLiant servers to be connected providing maximum return on investment and minimal storage management costs.

- DL380 G4 Package Cluster features:
  - Two HP ProLiant DL380 G4 servers (1 processor per server) plus the HP StorageWorks Modular Smart Array (MSA1000) storage system combined in an 8U configuration fixture
  - MSA1000 SAN Switch 2/8
  - (2) HP 4 Gb Fibre Channel Host Adapters (PN: AE311A)
  - U320 SCSI 10K and 15K rpm Universal Hard Drives supported
- HP ProLiant DL380 G4 Features - Per Server:
- Processors:
  - Intel® Xeon® 3.6 GHz processors with 64-bit extensions with 2MB of L2 cache
  - 800MHz Front Side Bus
  - Intel® E7520 Chipset
- Memory:
  - Up to 12GB of PC2-3200 DDR2 SDRAM running at 400 MHz
- Server Storage Controller:
  - Integrated Ultra320 Smart Array 6i Plus Controller with 64MB RAM and optional 128MB Battery-Backed Write Cache (BBWC) Enabler option kit
- Internal Drive Support:
  - Support for up to six Ultra320 SCSI hot plug hard drives or for five hot plug hard drives and one DAT hot plug tape

drive
  - Internal hot plug capacity 1.80TB standard (6 x 300GB HDD)
  - Optional dual channel drive backplane
- Network Controller:
  - Embedded NC7782 PCI-X Gigabit Server Adapter
- Expansion Slots:
  - 3 Total PCI-X slots: (2) non-hot plug 64-bit/100MHz slots; (1) non-hot plug 64-bit/133MHz slot
  - Optional PCI-X Hot-Plug cage
  - Optional PCI-E Non-hot plug Cage (2) x 4
- USB 2.0 Ports:
  - 3 Total: 1 front; 2 rear accessible ports
- Redundancy:
  - 575-Watt Hot Plug Power Supply (with optional redundancy)
  - Hot Pluggable Redundant Fans
- Management:
  - Integrated Lights-Out (iLO) Management standard on system board
  - Automatic Server Recovery (ASR), ROM Based Setup Utility (RBSU), HP System Insight Manager, Status LEDs including system health and UID and SmartStart
- Form Factor:
  - Rack (2U), (3.5-inch)
- Deployment/Serviceability:
  - Quick Deploy Rail System includes sliding universal rails and an ambidextrous cable management arm for easy serviceability and in-rack tool-less access to major components
  - Tool-less rack-rail included supports round and square hole racks
- Warranty:
  - o This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. SATA hard drives have a one-year warranty.
    NOTE: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html
- HP StorageWorks Modular Smart Array 1000 features:
  - 4U Rack Mount Fibre Channel Storage, and one MSA1000 controller (redundant optional)
  - Support for HP Ultra2, Ultra3, and Ultra320 Universal Drives
  - 14 hot plug drive bays, up to 2TB storage (with 146GB drive)
  - Scaleable up to 12.6TB of storage (42 x 300GB U320 drives) via HP StorageWorks Modular Smart Array 30 (MSA30) disk enclosures (each MSA30 provides 14 hot plug drive bays)
  - 4 Gb Fibre Channel host connections (support for 1, 2 and 4 Gb Fibre Channel fabrics)
  - Embedded 8-port 4 Gb Fibre Channel Fabric Switch (redundant optional)
  - RAID-ADG (Advanced Data Guarding)
  - Battery-Backed 256-MB cache, upgrade to 512-MB cache
  - Hot Plug redundant power supplies and fans
  - Compatible with ISV backup and restore software from Hewlett Packard, VERITAS and others

Standard Features

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Server	HP ProLiant DL380 G4 Server (Qty 2) NOTE: Complete information on the server can be found in the following QuickSpecs: http://h10010.www1.hp.com/wwpc/us/en/ss/WF05a/15351-241434-241475-241475-f79-397634.html	
Processor (per server)	Intel® Xeon® Processor 3.6 GHz-2MB	
Cache Memory (per processor)	2MB second level ECC cache (full speed)	
Upgradeability (per server)	Upgradeable to dual processing	
Chipset (per server)	Intel® E7520 Chipset NOTE: For more information regarding Intel®, please see the following URL: http://www.intel.com/products/server/chipsets/.	
Memory Protection (per server)	2-way interleaved capable, Advanced ECC and Online Spare Capabilities	
Memory (per server)	Type	PC2-3200 DDR2 SDRAM running at 400 MHz
	Standard	1 GB (2 x 512 MB)
	Maximum	12 GB
Network Controller (per server)	Embedded NC7782 PCI-X Gigabit Server Adapter	

Standard Features

Expansion Slots (per server)

Slot Number	Bus Speed	Bus Number*	Device Number**	Hot Plug	PCI Voltage
1	64-bit/133MHz PCI-X	10	1	no	3.3 Volt
2	64-bit/100MHz PCI-X	6	1	no	3.3 Volt
3	64-bit/100MHz PCI-X	6	2	no	3.3 Volt

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.
** Slots are enumerated differently based on OS. MS OS's enumerate from lowest to highest Device ID by bus (starting with the lowest bus).
NOTE: All slots can accept universal keyed PCI cards

Storage Controllers (per server)

Smart Array 6i Controller (Ultra320) (integrated on system board)
FCA2214 Host Adapter (Linux, Novell & 32-bit Windows) (1 per server for connectivity to the MSA1000)

NOTE: For complete list of devices supported the Smart array 6i Controller see the following: http://h18000.www1.hp.com/products/quickspecs/12030_na/12030_na.html (Worldwide)

Storage (per server)

Optical Drive	24x IDE CD-ROM Drive (Slimline)
Hard Drives	none

Maximum Internal Storage Type (per server)

Hot Plug SCSI	1.80TB	6 x 300GB Ultra320

Interfaces (per server)

Serial	1
Pointing Device (Mouse)	1
Graphics	1
Keyboard	1
External SCSI	1
2 Gb Fibre Channel	1 (via FCA2214 Host Adapter, occupies one PCI slot in the server)
Network RJ-45	3 (1 for iLO)
USB 2.0 Ports	3 total: 1 front, 2 back NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.

Graphics (per server)

Integrated ATI Rage XL Video Controller with 8-MB SDRAM Video Memory

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Form Factor (per server)

Rack (2U), (3.5-inch) per server, 8U configuration fixture for complete cluster

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Standard Features

HP Insight Control Management Suites

HP Insight Control Environment delivers foundation management, including remote monitoring, hardware resource deployment, health monitoring, software version control, performance monitoring, vulnerability scanning and patch management, and power management.
HP Insight Control Environment installs and licenses the following components by default using a wizard-based integrated installer:

- HP Systems Insight Manager
- HP iLO Advanced Pack
- HP Rapid Deployment Pack
- HP Insight Power Manager
- HP Performance Management Pack
- HP Vulnerability and Patch Management Pack

Additional ProLiant Essentials software and management tools included on the Insight Control Management kit can be installed manually

- HP Server Migration Pack - Universal Edition
- HP Open Service Event Manager
- HP Instant Support Enterprise Edition

NOTE: Server Migration Pack - Universal Edition can be installed from the SMP Universal CD included in the Insight Control Management media kit.
NOTE: For additional product and licensing information about HP Insight Control Environment, visit: http://www.hp.com/go/ice.

HP Insight Control management suites and most HP ProLiant Essentials include a one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: http://www.hp.com/services/insight.

Server Management Stand Alone Software Product - ProLiant Essentials

HP Systems Insight Manager	HP Systems Insight Manager (HP SIM) provides a unified, secure and extensible standards-based environment to centrally manage servers, storage and other infrastructure devices, (both HP and non-HP) across multiple operating system platforms.
ProLiant Essentials Rapid Deployment Pack	Rapid Deployment Pack (RDP) extends HP Systems Insight Manager with a complete deployment solution for HP ProLiant servers. RDP provides a central location to configure server hardware, deploy Windows, Linux and VMware ESX operating environments and install HP ProLiant Support Pack drivers using images and scripted profiles. For more information, visit: http://www.hp.com/servers/rdp.
ProLiant Essentials Server Migration Pack - Universal Edition	Upgrading, replacing, or virtualizing your existing server? Effortlessly transition to new virtual or physical HP ProLiant servers or BladeSystem with automated, accurate and affordable migration of OS, application and data. SMP Universal automates the manual processes required for migrating servers between physical or virtual platforms, whether migrating to VMware or Microsoft virtual machines. SMP Universal allows all of the following migrations: • physical to ProLiant • physical to virtual • virtual to virtual

		• virtual to ProLiant NOTE: For more information, visit: http://www.hp.com/go/migrate.
	ProLiant Essentials Performance Management Pack	Performance Management Pack (offered exclusively through the Insight Control suites) - a performance management solution that identifies and explains hardware performance bottlenecks on ProLiant servers and attached options enabling users to better utilize their valuable resources
	Integrated Lights-Out Advanced Pack	Upgrades the iLO 2 processor with comprehensive remote control including Virtual KVM remote graphical console, enhanced console sharing and replay, virtual media (floppy, CD/DVD, USB key), virtual folders, and enterprise security (directory services and two-factor authentication).
	iLO Power Management Pack	Energy-efficient management software that delivers centralized control, reliable security, and energy savings for your BladeSystem infrastructure. iPMP combines the total control of iLO 2 Advanced in the area of remote management with the energy monitoring and control of the Insight Power Manager to deliver a robust solution capable of full remote control and power management of ProLiant servers through a unified interface within HP Systems Insight Manager.
	ProLiant Essentials Accelerated iSCSI Pack	Enables the embedded Multifunction network controller to serve as both a NIC and an iSCSI HBA providing access to SAN storage over the same connection used for networking. Processing of the protocol stack is offloaded to the NIC reducing CPU utilization and greatly improving the speed with which the requests are processed and sent to the network.
	HP Insight Power Manager (IPM)	Upgrades the single-server remote management capabilities of iLO Select/Advanced to include centralized reporting and policy-based management of power consumption and thermal output provided by the Insight Power Manager. IPM unifies all of this functionality within a single user interface - HP Systems Insight Manager.
	NOTE: Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to: http://www.hp.com/servers/proliantessentials or the various ProLiant Essentials Value Pack product QuickSpecs for more information.	
Core Infrastructure Management	SmartStart	SmartStart is a tool that simplifies server setup, providing a rapid way to deploy reliable and consistent server configurations. For more information, please visit the SmartStart Web site at: http://www.hp.com/servers/smartstart. SmartStart version supported (minimum): SmartStart 7.51.
	Insight Management Agents	The Insight Management Agents should be installed on all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers. Insight Management Agents and The HP System Management Homepage are included on ProLiant Support Packs, and can also be installed using the server profiles provided with the ProLiant Essentials Rapid Deployment Pack. For additional information about the Management Agents and the HP System Management Homepage please visit the management Web site at:

Standard Features

		http://www.hp.com/servers/manage.
	Subscriber's Choice	Subscriber's Choice Driver and Support Alerts/Notifications is a web-based email subscription service that provides software and driver change notifications for ProLiant products. Sign up at: http://www.hp.com/go/subscriberschoice and customize your profile to receive various new alerts as they become available, on a weekly or monthly basis.
	ProLiant Support Packs and ROMPaq, software	The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options, available through ProLiant Support Packs the ProLiant Essentials Rapid Deployment Pack, SmartStart or downloaded from software and drivers download pages website at: http://www.hp.com/go/support.

Industry Standard Compliance	ACPI 1.0b Compliant PCI-X and PCI 2.2 Compliant WOL Support Microsoft® Logo certifications USB version 1.1
Security	Power-on password Keyboard password Diskette drive control Diskette boot control QuickLock, Network Server Mode Serial interface control Administrator's password
Server Power Cords	Four (4) total Lowline power cords ship standard (per cluster)
Power Supply (per server)	575 Watt, CE Mark Compliant Optional Hot Plug Redundant Power Supply Capability
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html
System Fans (per server)	Each server contains 8 hot plug fans standard NOTE: This applies to only cluster sku 381370-xx1.

Standard Features

Required Cabling	For required cabling information, refer to the HP Web site at: http://h10010.www1.hp.com/wwpc/us/en/ss/WF05a/15351-241434-241475-241475-f79-397634.html
DL380 G4 Packaged Cluster with MSA1000 Packaging	8U Configuration Fixture - Recyclable ABS material Unique cabling with positive identification (secured to storage configuration fixture) Two 5 meter Fibre Channel cables One 6 foot Ethernet cross over cables
Shared Storage	Modular Smart Array 1000 (Qty 1)
Documentation	Cluster set-up poster and configuration guide
OS Support	Microsoft Cluster Service (MSCS) • Microsoft Windows 2000 Advanced Server • Microsoft Windows 2003 Server, Enterprise Edition SteelEye LifeKeeper for Linux • Red Hat Enterprise Linux • SUSE Linux Enterprise Server HP Serviceguard for Linux • Red Hat Enterprise Linux • SUSE Linux Enterprise Server Novell Netware Cluster Service (NCS) • Novell Netware NOTE: For a more complete and up-to-date listing of supported OSs and versions, please visit our OS Support Matrix at: http://www.hp.com/go/supportos. NOTE: Please refer to compatibility matrix http://www.hp.com/products/sharedstorage for latest compatibility information. NOTE: For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix http://h18004.www1.hp.com/products/servers/linux/hpLinuxcert.html NOTE: For more complete and up-to-date information on how to buy server operating systems from HP please visit the OS product site at: http://h18004.www1.hp.com/products/servers/software/OEM.html

Standard Features

Packaged Cluster Software Components

The Packaged Cluster utilizes a single, consistent set of utility software for storage and RAID management, setup, configuration and troubleshooting. This consistency reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP server storage solution.

Configuration

- Array Configuration Utility (ACU) [On-line/Offline]
- Array Configuration Utility (ACU 6) [On-line, Remote Web-Based & Off-line]
- Option ROM Configuration for Arrays (ORCA)
- Selective Storage Present (SSP)
- ROM based set-up Utility (RBSU)

Management/Health

- HP Systems Insight Manager
- SmartStart
- Management Agents
- Redundant ROM
- Remote Flash ROM
- Integrated Lights-Out Support
- Remote Insight Lights-Out Edition
- Automatic Server Recovery (ASR)
- Active Update
- ROMPaq, support software and configuration utilities
- Survey Utility and diagnostics utilities
- Drive Parameter Tracking
- Dynamic Sector Repairing
- Hot Spare Boot
  NOTE: Upon the event of a failed processor or VRM in a multi-processing environment, the system will automatically reboot and use the remaining good processor(s).
- Pre-Failure Notification (covers processors, SCSI hard drives and memory)
- Optional ProLiant Essentials Value Packs: Rapid Deployment Pack, Workload Management Pack, Integrated Lights Out
- Optional Remote Management Packs: Integrated Lights-Out

HP StorageWorks Secure Path Optional Software

Secure Path is a family of high availability multi-pathing software products providing continuous data access from the MSA1000 to ProLiant servers running the Windows Server 2003, Windows 2000, Windows NT, Linux and NetWare operating systems.
Redundant hardware, advanced RAID technology and Secure Path's automated failover capability are used to enhance fault tolerance and availability. Secure Path effectively eliminates controllers, disk drives, interconnect hardware and host bus adapters as single points of failure in the storage subsystem. The attachment of non-Secure Path (single HBA) servers to an MSA1000 with dual controllers that has servers with Secure Path (dual HBA) attached is supported where the operating systems are Windows or NetWare. Users must realize that in event of a controller fail-over (failure of active controller) the single path servers will lose access to their data on the MSA1000.
NOTE: If Secure Path for Linux is used on any node or cluster attached to an MSA1000, all nodes must also have Secure Path installed, regardless of operating systems.
NOTE: Refer to http://www.hp.com/go/securepath for the latest Secure Path parameters.

Key Features

Maintains connections to storage

Monitors I/O paths and alerts on significant events

Standard Features

Used in	Stand alone Configurations Cluster configurations SAN configurations

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and/or storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging to meet customer needs. HP products supported through Factory Express include: HP Integrity, HP ProLiant & Blades, HP 9000 servers and the MSA1000, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches storage products.

For more information on Factory Express services for your specific server model please contact your sales representative or go to http://www.hp.com/go/factory-express.

HP Enterprise Configurator

The HP eCo-Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance.

Rack Airflow Requirements

Rack 10000 series Cabinets

The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 830 square inches (5,350 sq cm) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 2.75 inches (7 cm).

CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: http://h18004.www1.hp.com/solutions/enterprise/highavailability/dl380/index-msa1000.html.

Standard Features

Rack Kit (Servers)	Tool-Free support for racks with square mounting holes (including Compaq/HP 7000, 9000, 10000 and H9 series), with an adjustment range of 24" - 36". NOTE: The Modular Smart Array 1000 tool-less rack rail included in the Packaged Cluster accommodates most round or square hole rack standard.
Service and Support	HP Care Pack services provide total care and support expertise with committed response designed to meet your IT and business needs. HP Care Pack services include coverage for the HP branded hardware options qualified for the server and purchased at the same time or afterward that are internal to the enclosure. This also includes the 22" and smaller external monitors and tower UPS options up to 3kVA. These items will be covered at the same service level and for the same coverage period as the server. Coverage of UPS Battery is not included, and standard warranty terms & conditions apply. For servers or storage systems installed within a rack, service also covers all HP qualified rack options installed within the same rack. To fully capitalizing on your HP ProLiant servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions, provides a range of support services designed to meet the varying needs of your business. Whether an SMB, or large global corporation, HP has a ProLiant server support offer to help you speedily deploy and maximize system uptime. Recommended Service - simplify ProLiant solution implementation, maintenance, and management. • Support - 3 Year 4-Hour response 24x7 Same Business Day Coverage only • Deployment Service - Installation and Start up only Enhanced Service - optimize service level to increase IT performance and availability. • Support - 3 Year Support Plus 24 only Refer to the information on "Installation & Start-Up" for service on ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet; to be delivered on a scheduled basis 8am-5pm, M-F, excluding HP holidays. NOTE: For a complete listing of service offerings and information visit: http://www.hp.com/services/proliantservices http://www.hp.com/go/proliant/carepack
HP StorageWorks Modular Smart Array 1000	The 4U cabinet houses up to fourteen Universal hot pluggable Ultra2, Ultra3, and/or Ultra320 drives. Each MSA1000 includes the following standard components: (1) MSA1000 Controller, (1) MSA Fibre Channel I/O Module with a single SFP, dual hot pluggable fans/power supplies and power cables, (2) 3' VHDCI to VHDCI SCSI cables to connect expansion enclosures, documentation and a support software CD. The modular design of the MSA1000 makes it possible to add redundant controllers, redundant single port Fibre Channel I/O Modules, 3-port hub, or embedded fabric switches and storage expansion enclosures. Additional storage enclosures may be added without power cycling the MSA1000.

Standard Features

MSA1000 Controller

The MSA1000 Controller is an integrated RAID controller with an LCD/LED status display and 256 MB read/write battery-backed cache (expandable to 512 MB per controller). One MSA1000 Controller is included with the MSA1000; a redundant MSA1000 Controller is an option.

Key Features

- Redundant controller support with mirrored cache
- Fabric, Private Loop & Public Loop Support
- Auto Negotiated F, FL & L Port Login
- RAID 0, 1, 1+0, 5 and ADG
- 2 Gb/1 Gb Frequency Agile
- Primary & Secondary Inter-Controller Link (ICL)
- Host based configuration via ACU
- Optionally configurable with Command Line Interface (CLI)
- Remote configuration and monitoring via ACU (offline and remote) & IM

MSA1000 Controller Management Features

- **Selective Storage Presentation:** allows multiple hosts to access a single MSA1000 storage system. Host access can be defined all the way down to a logical volume level.
- **Online RAID Level Migration:** allows for online post-configuration change to RAID level without destroying data or volume information.
- **Online Capacity Expansion:** lets you add storage to an operational MSA1000-reducing expensive server downtime.
- **Global Online Spare:** reduces the risk of data loss by facilitating automatic rebuilds after a drive failure.

Fault Tolerance

Several fault tolerant configurations which keep data available and servers running while drives are being replaced are supported including:

- Advanced Data Guarding (RAID ADG): Allocates the equivalent of two parity drives across multiple drives and allows simultaneous write operations.
- Distributed Data Guarding (RAID 5): Allocates parity data across multiple drives and allows simultaneous write operations.
- Drive Mirroring (RAID 1, (1+0 Striped Mirroring)): Allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file.

Fault Recovery

Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure:

- Online Spares: If a failure occurs, recovery begins with an online spare and data is reconstructed automatically. Multiple online spares can be assigned per array and used across multiple arrays. It is also possible to assign different online spares across different arrays.
- Array Accelerator: Onboard, battery-backed cache memory protects data in the event of a power failure. In the unlikely event of a controller failure, the battery-backed cache will save critical user data for up to three days.

Standard Features

MSA1000 Storage	Drive bays	14 Hot pluggable
	Drive bays scalability	Up to 42 hot pluggable drive bays via two MSA30 disk enclosures (14 drive bays per MSA30)
	Hard Drives	None
	Maximum Internal Storage	Base MSA1000: 4.2TB (14 x 300GB Ultra320) With one MSA30: 8.4TB (28 x 300GB Ultra320) With two MSA30: 12.6TB (42 x 300GB Ultra320)
	SCSI Hard Drive	Pre-failure warranty

MSA1000 Storage Standard Contents	HP StorageWorks Modular Smart Array 1000 (4U) One MSA1000 Controller with 256 MB cache One MSA SAN Switch 2/8 (integrated) (Includes four 2Gb SFPs) Redundant Hot Pluggable power supply/fans Redundant Hot Pluggable Power Supply/blower assemblies Universal Rack-mounting Kit Two Power cables MSA1000 Support CD & Documentation Ethernet Crossover cable for clustering Serial cable Two 3-ft VHDCI to VHDCI SCSI cables NOTE: The MSA SAN Switch 2/8 has a total of eight Fibre Channel ports. There are seven ports accessible by the user and the eighth is internal to the controller. Four SFPs are shipped installed in the Switch.
MSA1000 Storage Controller	MSA1000 Controller, redundant controller capable
MSA1000 Host Bus Adapters	FCA2214 Host Adapter (Linux, Novell & 32-bit Windows) (one per server)

MSA1000 Cache Memory	256 MB Read/Write Cache	Up to 512 MB Read/Write Cache (optional)
	ECC protection, battery backed, removable	NOTE: Optional storage memory allows the following configurations: 1 x 256 MB or 2 x 256 MB.
	NOTE: When redundant controllers are installed, the cache configurations in both controllers must be identical.	

MSA1000 Cache Batteries	Up to three days of redundant battery life, removed for easy replacement

Standard Features

MSA1000 Upgradeable Firmware	2 MB flashable ROM
MSA1000 Power Supply	499 Watt (Dual) Power Supply, CE Mark Compliant Fans integrated into each power supply, Redundant Functionality (Standard)
MSA1000 Disk Drive and Enclosure	Ultra320, Ultra3 and Ultra 2 SCSI Universal drives
MSA1000 Form Factor	Rack 4U, (7.0 inch)
MSA1000 Connector Type	2 Gb or 1 Gb Fibre Channel
MSA1000 Ports	2 VHDCI; Ultra3 SCSI
MSA1000 Bandwidth	>200 MB/s >30,000 IO/s
MSA1000 Disk Drive & Disk Enclosure Protocols Supported	Ultra3 SCSI and Ultra2 SCSI
MSA1000 User Interface	Controller display with Status Indicators (2) and Push Buttons (4) Status indicators on front of controller (16)
MSA1000 Controller Protocol support	2 Gb Fibre Channel
MSA1000 SCSI Ports	2 external VHDCI connectors standard for use for MSA30 disk enclosures
MSA1000 Logical Drives	Up to 32 logical drives
MSA1000 RAID Support	Raid ADG (Advanced Data Guarding) Raid 5 (Distributed Data Guarding) Raid 1+0 (Striping and Mirroring) Raid 1 (Mirroring) Raid 0 (Striping)

Models

DL380 G4 Packaged Cluster 3.6 GHz with MSA1000 381370-001	Processor(s)	(1) Intel® Xeon® Processor 3.6 GHz standard (up to 2 supported)
	Cache Memory	2MB level 2 ECC cache
	Memory	1 GB (Standard) to 12 GB (Maximum) of 2 way interleaved capable PC2-3200 400MHz DDR2 SDRAM, with Advanced ECC capabilities
	Network Controller	NC7782 Dual Port PCI-X 1000T Gigabit Server Adapter (embedded)
	Storage Controller	Ultra320 Smart Array 6i controller (integrated on system board) (2) FCA2214 Host Adapter (Linux & 32-bit Windows)
	Hard Drives	None ship standard
	Internal Storage	1.80TB (6 x 300 GB Ultra320) (with optional hard drives)
	Optical Drive	24x IDE CD-ROM Drive
	Modular Smart Array 1000	1 Modular Smart Array 1000 with 14 drive bays. Includes one MSA1000 Controller, redundant optional
	Form Factor	Rack (2U), (3.5-inch)

Configure To Order

IMPORTANT: The base cluster models listed above cannot be customized. If you require additional customization to the base cluster model, then you must use the Configure-To-Order process to receive a complete factory integrated cluster with options delivered in a single package. The Purchase Order must list each part number individually along with any options to begin the order. This should be communicated in advance with the HP sales or client services at 1-800-888-0292. See steps below for more details.

Step 1: Choose 8U Configuration Fixture

HP 8U Configuration Fixture for Fibre cluster 378027-B21

NOTE: This ensures the cluster is delivered in a single package with all necessary documentation and cables. It will be delivered just like the base cluster model in an 8U configuration fixture for easy setup.

Step 2: Choose two (2) DL380 servers

IMPORTANT: You must choose two (2) identical servers.

HP ProLiant DL380G4 Rack Chassis 371293-405

IMPORTANT: You must choose at least one (1) Fibre Channel Adapter (FCA2214) per server for storage connectivity.

StorageWorks 2 Gb, 64-bit/133 MHz PCI-X-to-Fibre Channel Host Bus Adapter (FCA2214) 281541-B21

NOTE: Not all server options are supported in the HP ProLiant DL380 Packaged Cluster. For additional information on supported options, please contact Client Services at: 1-800-888-0292.

Please refer to the HP ProLiant DL380 G4 server QuickSpecs for information on CTO server models and options.
HP ProLiant DL380 G4 server QuickSpecs:
http://h10010.www1.hp.com/wwpc/us/en/ss/WF05a/15351-241434-241475-241475-f79-397634.html

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Step 3: Choose one (1) Modular Smart Array 1000 System

HP StorageWorks Modular Smart Array 1000 201723-B22

Packaged Content includes:

- Modular Smart Array 1000 Chassis
- MSA1000 Controller with 256MB cache
- Redundant Hot Pluggable Power Supply/Blower assemblies
- Universal Rack Mounting Kit
- MSA1000 Support CD & Documentation
- Serial cable
- Power cables

IMPORTANT: You must choose at least one (1) MSA SAN Switch integrated option for SAN connectivity.

HP StorageWorks MSA SAN Switch 2/8 (integrated) 288247-B21
NOTE: Includes four 2Gb SFPs

HP StorageWorks MSA Hub 2/3 (integrated) 286763-B21
NOTE: Includes two 2Gb SFP transceivers

Please refer to the MSA1000 QuickSpecs for information on CTO model and options.
MSA1000 QuickSpecs: http://hp.com/go/msa1000.

Options (DL380 Generation 4 Packaged Cluster with MSA1000)

NOTE: Some options may not be factory configurable. Please contact your local sales representative for additional information.

Processor	Intel® Xeon® X3.6 GHz-2MB/800MHz Processor Option Kit	378751-B21
Memory (SDRAM DIMMs)	1 GB of Advanced PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 512 MB)	343055-B21
	2 GB of Advanced PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 1024 MB)	343056-B21
	4 GB of Single-Ranked PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 2048 MB)	343057-B21
	4 GB of 2-Rank Advanced ECC PC3200 DDR2-400 SDRAM DIMM Memory Kit (2 x 2048 MB)	375004-B21
Storage Rail Kit (Round Holes)	Round hole rack cabinet rail kit NOTE: Supports for racks with round mounting holes (including HP rack systems/E and HP systems), with an adjustment range of 24"- 36". NOTE: The standard storage rails already support most square and round hole racks.	293052-B21
Riser Cards	PCI-X Hot Plug Riser Cage Option Kit	354676-B21
	PCI-Express Riser Cage Option Kit NOTE: For information about PCI Express visit: http://www.hp.com/servers/pci-express	354675-B21
Server Management Stand Alone Software Product - ProLiant Essentials	NOTE: Electronic licensing options are available for select ProLiant Essentials software products. Please see the appropriate ProLiant Essentials QuickSpecs for additional information.	
	Deploy	
	ProLiant Essentials Rapid Deployment Pack	
	ProLiant Essentials Rapid Deployment Pack No Media 1-Server License including 1 year of 24x7 Technical Support and Updates NOTE: This license allows 1 server to be deployed and managed via RDP. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service NOTE: For additional License Kits, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/11053_na/11053_na.html	452151-B21
	HP Server Migration Pack - Universal Edition	
	HP Server Migration Pack - Universal Edition, No Media, Physical / Virtual to ProLiant Single Migration License, including 1 year of 24x7 Technical Support and Updates NOTE: This license allows 1 physical to ProLiant or virtual to ProLiant migration. Customer will receive a printed license entitlement certificate and documentation via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.	460750-B21
	HP Server Migration Pack - Universal Edition, No Media, Physical / Virtual to Virtual Single Migration License, including 1 year of 24x7 Technical Support and Updates	460753-B21

NOTE: This license allows 1 physical to virtual or virtual to virtual migration. Customer will receive a printed license entitlement certificate and documentation via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.

HP Server Migration Pack - Universal Edition, No Media, 1-Year Unlimited Migration License, including 1 year of 24x7 Technical Support — 460756-B21
NOTE: This license allows unlimited migrations (physical to ProLiant, physical to virtual, virtual to virtual, and virtual to ProLiant) for one year. Customer will receive a printed license entitlement certificate and documentation via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.

NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/12855_na/12855_na.html

Control

Integrated Lights-Out Select Pack

ProLiant Essentials Integrated Lights-Out Select Pack, No Media, 1-Server License — 452158-B21
NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/12362_na/12362_na.html

Integrated Lights-Out Advanced Pack

Integrated Lights-Out Advanced Pack, No Media ,1 Server License — 452141-B21
NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/10861_na/10861_na.html

Optimize

Accelerated iSCSI Pack

ProLiant Essentials Accelerated iSCSI Pack, No Media, Single License — 452679-B21
NOTE: For use with a single NIC port. Contains one license with a unique license activation key and documentation.

NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/12466_na/12466_na.html

HP Insight Power Manager (IPM)

HP Insight Power Manager, No Media, 1-Server License, including 1 year of 24x7 Technical Support and Updates — 452677-B21
NOTE: Customers purchasing this upgrade must already have an iLO Advanced or Select license on each managed server. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.
NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/12623_na/12623_na.html

ProLiant Essentials Virtual Machine Management Pack

ProLiant Essentials Virtual Machine Management Pack, No Media, 1-Server License, including 1 year of 24x7 Technical Support and Updates — 452153-B21
NOTE: Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.

Options (DL380 Generation 4 Packaged Cluster with MSA1000)

	NOTE: For additional License Kits, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12328_na/12328_na.html	
	RDMA Pack	
	RDMA Pack for Embedded Multifunction Gigabit Server Adapters, No Media, 1-Server License	452681-B21
	NOTE: For additional License Kits, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12573_na/12573_na.html	
	NOTE: Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to: http://www.hp.com/servers/proliantessentials or the various ProLiant Essentials QuickSpecs for more information.	
Communications	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC7170 PCI-X Dual Port 1000T Gigabit Server Adapter	313881-B21
	HP NC7771 PCI-X 1000T Gigabit Server Adapter	290563-B21
Redundant Options	Hot Plug AC Redundant Power Supply Module (NEMA cord)	355892-001
Optical Drives	Slimline DVD-ROM Drive (8X/24X) Option Kit (Servers)	264007-B21
	Slimline CD-RW/DVD-ROM Combo Drive Option Kit	331903-B21
	HP DVD±R/RW 8X Slim	383975-B21
Diskette Drives	Floppy Drive Option Kit	364507-B21
Hard Drives	Ultra320 SCSI - Universal Hot Plug	
	HP 300GB U320 10K Universal HDD	350964-B22
	HP 146GB U320 10K Universal HDD	286716-B22
	HP 72GB U320 10K Universal HDD	286714-B22
	HP 300GB U320 15K Universal HDD	411089-B22
	HP 146GB U320 15K Universal HDD	347708-B22
	HP 72GB U320 15K Universal HDD	286778-B22
	HP 36GB U320 15K Universal HDD	286776-B22
	NOTE: All U320 Universal Hard Drives are backward compatible to U2 or U3 speeds. U320 drives require an optional U320 Smart Array Controller or U320 SCSI HBA to support U320 transfer rates.	
	NOTE: Please see the Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/11531_na/11531_na.html	

Options (DL380 Generation 4 Packaged Cluster with MSA1000)

SCSI Configuration Kit	SCSI Configuration Kit NOTE: Kit Includes duplex drive backplane terminator and 2 long SCSI cables.	364471-B21
Modular Smart Array 1000 Options	MSA1000 Controller, with 256 MB cache	218231-B22
	MSA Fabric Switch 2/8	288247-B21
	256-MB Battery-Backed Cache Module	254786-B21
	NOTE: Optional storage memory allows the following configurations: 1 x 256 MB (standard), 2 x 256 MB.	
	NOTE: When redundant controllers are installed, the cache configurations in both controllers must be identical.	
	HP StorageWorks Secure Path v4.0C for Windows Workgroup Edition	213076-B26

Options

Management Options	Remote Insight Lights-Out Edition II	227251-001

Tape Drives

NOTE: For the complete listing of Tape Drive offerings, please see: http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html

For recommended tape drive offerings for this ProLiant server see the following:

SCSI Tape Drives

NOTE: For the DL380 G4 Packaged Cluster, HP recommends purchasing the HP 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 (374654-B21) for a dedicated SCSI HBA for tape.

HP StorageWorks LTO-2 Ultrium 448 SCSI Internal Tape Drive (Carbonite)	DW016A
HP StorageWorks LTO-3 Ultrium 920 SCSI Internal Tape Drive	EH841A
HP StorageWorks 3U SCSI Rack-Mount with 1 LTO-4 Ultrium 1840 Tape Drive	EH926A

NOTE: Please see the HP StorageWorks Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items:
http://h18006.www1.hp.com/products/quickspecs/11739_na/11739_na.html
http://h18006.www1.hp.com/products/quickspecs/12128_na/12128_na.html

For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: http://www.hp.com/go/connect.

Rack-Mount Tape Drive Enclosures

HP StorageWorks 1U SCSI Rack-Mount kit NOTE: The 1U Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including the DAT 40, DAT 72, DAT 160, DLT VS160, LTO-1 Ultrium 232, LTO-2 Ultrium 448 and LTO-3 Ultrium 920 tape drives.	A7445B
HP StorageWorks 3U SCSI Rack-mount Kit NOTE: The 3U SCSI Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and is compatible with multiple LVD SCSI tape drives including DAT 40, DAT 72, DAT 160, DLT VS160, SDLT 600, LTO-1 Ultrium 232, LTO-2 Ultrium 460, LTO-2 Ultrium 448, LTO-3 Ultrium 920, LTO-3 Ultrium 960 and LTO-4 Ultrium 1840 tape drives.	274338-B22

NOTE: Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits:
http://h18000.www1.hp.com/products/quickspecs/10854_na/10854_na.html

Options

Tape Autoloaders	**HP StorageWorks DAT Autoloader**	
	HP StorageWorks DAT 72x10 tape autoloader	AE313B
	HP StorageWorks 1/8 Tape Autoloader	
	HP StorageWorks 1/8 LTO-3 Ultrium 920 G2 Tape Autoloader	AH165A
	HP StorageWorks 1/8 LTO-2 Ultrium 448 G2 Tape Autoloader	AH164A
	HP StorageWorks 1/8 LTO-1 Ultrium 232 G2 Tape Autoloader	AH163A
	HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit	AH166A
	NOTE: Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions	
	NOTE: Please reference the Tape Autoloader QuickSpecs at: http://www.hp.com/go/automation for additional information needed to create a complete solution.	
Tape Libraries	**HP StorageWorks MSL2024 Tape Library**	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 4GB FC Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 SCSI Drive Library	AG115A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 4GB FC Library	AG326B
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SCSI Drive Library	AH169A
	HP StorageWorks MSL2024 1 LTO-2 Ultrium 448 SCSI Drive Library	AG116A
	HP StorageWorks MSL4048 Tape Library	
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ035A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library	AJ036A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 960 SCSI Drive Library	AG322A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 960 4GB FC Library	AG324B
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 SCSI Drive Library	AH171A
	HP StorageWorks MSL4048 1 LTO-2 Ultrium 448 SCSI Drive Library	AG320A
	HP StorageWorks MSL8096 Tape Library	
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ039A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 4GB FC Library	AJ040A
	HP StorageWorks MSL8096 2 LTO-3 Ultrium 960 4GB FC Library	AH218A
	HP StorageWorks MSL8096 2 LTO-3 Ultrium 960 SCSI Drive Library	AH219A
	HP StorageWorks MSL6000 Tape Library	
	LTO-4 Ultrium 1840 technology	
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ029A
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 4GB FC Library	AJ030A
	HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ031A
	HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 4GB FC Library	AJ032A
	Ultrium 960 technology	
	HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 SCSI Drive Library	AD606B
	HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 4GB FC Library	AD608B

Options

	HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 SCSI Drive Library	AD607B
	HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 4GB FC Library	AD609B
	NOTE: Please reference the MSL2024, MSL4048 and MSL6000 Tape Library QuickSpecs at: http://www.hp.com/go/automation for additional information needed to create a complete solution; reference current compatibility information at: http://www.hp.com/go/ebs.	
HP StorageWorks Modular Smart Array 30	HP StorageWorks Modular Smart Array 30 SB	302969-B21
	NOTE: Rack-mountable 14 drive enclosure with single bus, redundant power supplies	
	HP StorageWorks Modular Smart Array 30 DB	302970-B21
	NOTE: Rack-mountable 14 drive enclosure with dual bus, redundant power supplies	
	NOTE: Please see the Modular Smart Array 30 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: http://h18000.www1.hp.com/products/quickspecs/11738_na/11738_na.html	
Cluster Options	HP Serviceguard for Linux ProLiant Cluster, A.11.18 (2 license version - Red Hat EL 4&5, SUSE SLES10)	305199-B27
	HP Serviceguard for Linux, A.11.18 (single license version - Red Hat EL 4&5, SUSE SLES10)	307754-B27
	HP Serviceguard for Linux and Red Hat Global File System - 1 year subscription	T2798AA#001
	HP Serviceguard for Linux and Red Hat Global File System - 3 years subscription	T2798AA#003
	NOTE: For additional information regarding the HP Serviceguard for Linux ProLiant Cluster, please see the following QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/11518_na/11518_na.html	
Uninterruptible Power Systems – Rack Mountable	HP, R1.5kVA UPS, 1U	AF419A
	HP R3000 VA UPS, 2U, L5-30	AF422A
	HP R3000 VA UPS, 2U, L6-20	AF423A
	HP R5500 VA UPS	AF426A
HP Monitored Power Distribution Unit (PDU)	HP Monitored Power Distribution Unit: Full Rack Version	
	HP 17.3 kVA S2324 Monitored PDU- dual input, 3U, 24A	AF503A
	HP 8.3 kVA S1324 Monitored PDU- single input, 3U, 24A	AF504A
	HP 16.6 kVA S2140 Monitored PDU- dual input, 1U, 40A	AF505A
	HP 8.6 S1140 Monitored PDU- single input, 1U, 40A	AF506A

Options

Modular PDUs 1U/0U (Up to 32 outlets) NOTE: 1U/0U mounting brackets shipped with the unit (optimized for 10000 and 9000 series racks).	3.6kVA Model - mPDU, 16A, High	252663-B24
	2.8kVA Model - mPDU, 24A, Low	252663-D71
	4.9kVA Model - mPDU, 24A, High	252663-D72
	8.3kVA Model - mPDU, 40A, High	252663-B21
	8.3kVA Model - mPDU, 40A, High (power cord attached)	252663-D73
	8.3kVA Model - mPDU 40A, High (core only)	252663-D75
	4.9kVA Model - mPDU 24A, High (core only)	252663-D74
	NOTE: Please see the following Modular Power Distribution Unit (Zero-U/1U Modular PDUs) QuickSpecs for additional options including shorter jumper cables and country specific power cords: http://h18000.www1.hp.com/products/quickspecs/11041_na/11041_na.html	
HP Rack 5000 Series (Graphite Metallic)	HP 5642 Rack-Unassembled	358254-B21
	NOTE: Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/12074_na/12074_na.html	
	NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.	
HP Rack 10000 G2 Series (Carbon/Graphite Metallic)	10642 G2 (42U) Rack Cabinet - Pallet	AF001A
	10642 G2 (42U) Rack Cabinet - Shock Pallet	AF002A
	10642 G2 (42U) Rack Cabinet - Crated	AF003A
	10642 G2 (42U) Rack Cabinet, with Extension - Shock Pallet	AF004A
	10636 G2 (36U) Rack Cabinet - Pallet	AF011A
	10636 G2 (36U) Rack Cabinet - Shock Pallet	AF012A
	10636 G2 (36U) Rack Cabinet - Crated	AF013A
	10636 G2 (36U) Rack Cabinet , with Extension - Shock Pallet	AF014A
	10622 G2 (22U) Rack Cabinet - Pallet	AF021A
	10622 G2 (22U) Rack Cabinet - Shock Pallet	AF022A
	10842 G2 (42U) 800mm Wide Rack Cabinet - Pallet	AF041A
	10842 G2 (42U) 800mm Wide Rack Cabinet - Shock Pallet	AF042A
	10647 G2 (47U) Rack Cabinet - Pallet	AF031A
	NOTE: It is mandatory to use a shock pallet when shipping racks with equipment installed.	
	NOTE: Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/12402_na/12402_na.html	
	NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.	

Options

HP Rack 10000 Series (Graphite Metallic)	HP Rack S10614 (14U) Rack Cabinet - Shock Pallet	292302-B22
	NOTE: xxxxxx-B21 (pallet) used to ship empty racks shipped on a truck. -B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels). xxxxxx-B23 (crated) used for air shipments of empty racks.	
	NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed. Not all equipment is qualified to be shipped in the Rack 10000 series.	
	NOTE: Please see the Rack 10000 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/10995_na/10995_na.html	
	NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.	
Keyboards and Monitors	TFT7210R Rack Mounted 17" Monitor	348373-B21
	TFT7600 Rackmount Keyboard Monitor	AG052A
	1U Rackmount Keyboard with USB	AG072A
	NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.	
HP KVM Switch Options	2x1x16 IP Console Switch with Virtual Media	AF601A
	4x1x16 IP Console Switch with Virtual Media	AF602A
	2x16 Server Console Switch with Virtual Media	AF600A
	PS/2 Virtual Media Interface Adapter, 1 pack	AF604A
	NOTE: Requires PS/2 and one USB port on server.	
	Server Console Switch (KVM), 0 x 1 x 8 port	336044-B21
	Server Console Switch (KVM), 0 x 2 x 16 port	336045-B21
	PS/2 Interface Adapter, 1 pack	262588-B21
	PS/2 Interface Adapter, 8 pack	262587-B21
	USB Interface Adapter, 1 pack	336047-B21
	Serial Interface adapter - 1 Pack with power supply	373035-B21
	NOTE: Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: http://www.hp.com/go/kvm.	
	HP 1x4 Console Switch	AF611A
	PS2 Server Console Cable, 6 ft, 2 pack	AF612A
	USB Server Console Cable, 6 ft, 2 pack	AF613A
	NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm.	

Options

HP Serial Console Server Options	HP 16 Port Serial Console Server	AF101A
	HP 48 Port Serial Console Server	AF102A
	Serial Adapter, RJ45-DB9 DCE Female, 1 Pack	AF103A
	Serial Adapter, RJ45-DB9 DCE Female, 8 Pack	AF110A
	NOTE: Cat5e cables are required to connect Serial Adapters to Serial Console Servers. Additional Serial Adapters and Cat5e cables can be found at the following URL: http://www.hp.com/go/kvm.	
	NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm.	
Rack Options for Third Party Cabinet Racks	Round hole rack cabinet rail kit	293052-B21
	NOTE: Support for racks with round mounting holes (include HP Rack System /E and HP Systems) with an adjustment range of 24"- 36".	
Service and Support Offerings (HP Care Pack Services)	NOTE: The DL380 Packaged Cluster Care Pack services cover the two HP ProLiant DL380 G4 servers and the external storage component.	
	Hardware Services 4-Hour On-site Service	
	4-Hour On-site Service, 13-Hour x 5-Day Coverage, 3 Years, Electronic	U4560E
	4-Hour On-site Service, 24-Hour x 7-Day Coverage, 3 Years, Electronic	U4561E
	24-Hour x 7-Day, 6-hour Call To Repair, 3 Years, Electronic	U4562E
	Installation & Start-up Services	
	Hardware Installation, Electronic	U4570E
	Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays, Electronic	U2870E
	W2K AS Cluster Configuration HP Care Pack	
	Install & Configure MS Windows 2000 Advanced Sever Cluster software on a cluster, Electronic	U5701E
	Support Plus	
	Onsite HW support, 8am-9pm, M-F, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, Electronic	U4571E
	Support Plus 24	
	Onsite HW support 24x7, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic	U4572E
	NOTE: For more information, customer/resellers can contact http://www.hp.com/services/carepack.	

Memory

HP ProLiant DL380 G4 Packaged Cluster with Modular Smart Array 1000

Standard Memory

1 GB PC2 PC3200 DDR2 SDRAM running at 400MHz comes installed (2 x 512 MB SDRAM)

Standard Memory Plus Optional Memory

Up to 5 GB memory is available with the optional installation of PC2 PC3200 DDR2 SDRAM running at 400MHz memory kits.

Standard Memory Replaced with Optional Memory

Up to 12 GB memory is available with the removal of the standard memory and the optional installation PC2 PC3200 DDR2 SDRAM running at 400MHz memory option kits.

NOTE: Chart does not represent all possible configurations.

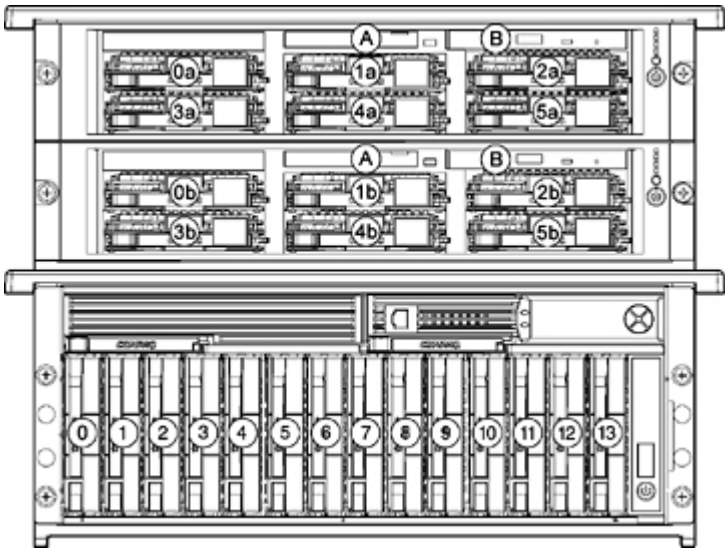
Memory		Slot					
		1	2	3	4	5	6
Standard	1 GB	512 MB	512 MB	Empty	Empty	Empty	Empty
Optional	5 GB	512 MB	512 MB	1024 MB	1024 MB	1024 MB	1024 MB
Maximum	12 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB

NOTE: Slots 3 and 6 can be configured as online spare memory through RBSU.

Following are memory options available from HP:

1 GB of Advanced PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 512 MB)	343055-B21
2 GB of Advanced PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 1024 MB)	343056-B21
4 GB of Advanced PC2 PC3200 DDR2 SDRAM DIMM Memory Kit (2 x 2048 MB)	343057-B21

Storage



0a - 5a	Six Ultra320 SCSI hot plug hard drive bays
0b-5b	Six Ultra320 SCSI hot plug hard drive bays
0-13	Fourteen Ultra320 SCSI hot plug drive bays
A	Optional 1.44-MB Diskette Drive
B	24x IDE CD-ROM (Slimline) NOTE: Only a CD-ROM drive is qualified for use in the MultiBay slot.
0a & 0b (or any pair of shared storage from 1-13)	Convertible 1.6" drive bay - supports either (1) Hot Plug Drive or (1) 1.6" AIT or 20/40/100-GB DAT Hot Plug Tape Drive

Drive Support

	Quantity Supported	Position Supported	Controller
1.44-MB Diskette Drive	Up to 1	A	Integrated
IDE CD-ROM Drive	Up to 1	B	Integrated IDE

Hard Drives

Ultra320 Hot Pluggable Drives

	Quantity Supported	Position Supported	Controller
300 GB U320 10K 146 GB U320 10K 72 GB U320 10K 300 GB U320 15K 146 GB U320 15K 72 GB U320 15K 36 GB U320 15K	Up to 26	0a-5a, 0b-5b, 0-13	Smart Array 6i Controller (integrated on system board) 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2

NOTE: All U320 Universal Hard Drives are backward compatible to U2 or U3 speeds. U320 drives require an optional U320 Smart Array Controller or U320 SCSI HBA to support U320 transfer rates.

Maximum Storage Capacity – (HP ProLiant DL380 G4, per server)

Internal	1.80TB (6 x 300 GB Ultra320)

Storage

Maximum Shared Storage Capacity (HP StorageWorks Modular Smart Array 1000)

Internal	4.20TB (14 x 300 GB Ultra320)
With one MSA30 enclosure	8.40TB (28 x 300 GB Ultra320)
With two MSA30 enclosures	12.60TB (42 x 300 GB Ultra320)

NOTE: Additional MSA30 disk enclosures must be purchased separately and not fit into the 8U Packaged Cluster fixture. MSA30 disk enclosures must be installed in an HP rack with the HP ProLiant DL380 Packaged Cluster with MSA1000. MSA30 enclosures may be purchased as tower models, as well.

Tape Drives, Tape Autoloaders, Tape Libraries & D2D Backup

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10233.html

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders and Tape Libraries listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10809.html

NOTE: For complete listing of tape drive offerings see http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html

NOTE: SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

	Position Supported	Controller	Controller Part Numbers
HP StorageWorks SCSI Tape Drives, External LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-2 Ultrium 460 LTO-3 Ultrium 960 LTO-3 Ultrium 920 LTO-4 Ultrium 1840 DAT 40 DAT 72 DAT 160 DLT VS160 SDLT 600 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Host Bus Adapter	412911-B21
HP StorageWorks SCSI Tape Automation, External DAT 72x10 Autoloader	External	HP SC11Xe Host Bus Adapter	412911-B21

Storage

1/8 G2 Autoloader MSL2024 MSL4048 MSL8096 MSL6000		HP U320e SCSI Host Bus Adapter NOTE: Only valid for MSL tape libraries.	AH627A
HP StorageWorks Fibre Tape Automation, External MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for detailed connectivity information.	N/A

Power Specifications

Part Number	194989-001
Spare Kit	19982-B21
Operational Input Voltage Range (Vrms)	90 to 264
Frequency Range (Nominal) (Hz)	47 to 63 (50/60)

Nominal Input Voltage (Vrms)	100	115	208	220	230	240
Max Rated Output Wattage Rating	400	400	400	400	400	400
Nominal Input Current (Arms)	5.8	5.0	2.7	2.5	2.4	2.3
Max Rated Input Wattage Rating (Watts)	571	563	548	541	541	541
Max. Rated VA (Volt-Amp)	583	575	559	552	552	552
Efficiency (%)	70	71	73	74	74	74
Power Factor	0.98	0.98	0.98	0.98	0.98	0.98
Leakage Current (mA)	0.31	0.36	0.65	0.69	0.72	0.75
Maximum Inrush Current (A peak)	50	50	50	50	50	50
Maximum Inrush Current duration	20	20	20	20	20	20

NOTES:
* To review typical system power ratings use the Active Answers Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/powercalcs.asp.

To drill down to calculators:
- Click on: "ProLiant Servers"
- Click on the Server of interest. Example: DL380 G4 Packaged Cluster
- Click on: "Power Calculator" link. (You may need to scroll down to see it)

Power Cords	Power Cord Part Number
US	163719-002

Modular Smart Array Cluster Storage Power Specification

Nominal Input Voltage (Vrms)	100V 60 Hz	120V 60 Hz	208 60 Hz	220V 50 Hz	240V 50 Hz
Nominal Input Current(Vrms)	4.50	3.69	2.08	1.97	1.80
Nominal Input Current (Watt)	448	442	429	428	427
Maximum Input Current (Vrms)	6.73	5.47	3.05	2.88	2.63
Maximum Input Current (Watt)	669	654	630	628	626
Efficiency (ratio of DC output to real input power at 499 Watts)	0.73	0.73	0.78	0.78	0.78
Inrush Current	65 Amps	65 Amps	65 Amps	65 Amps	65 Amps

System Unit - DL380 G4 Server	Dimensions (HxWxD	3.38 x 17.5 x 25.75 in (8.59 x 44.45 x 65.40 cm)	
	Weight	Maximum	60 lb (27.22 kg)
		No drives	47.18 lb (20.41 kg)
	Input Requirements (per power supply)	Range Line Voltage	100 to132 VAC/180 to 265 VAC
		Rated Input Current	7.5A (100VAC) to 3.8A (200VAC)
		Rated Input Frequency	50 to 60 Hz
		Rated Input Power	735W
	BTU Rating	2,508 BTU/HR	
	Power Specifications	To review typical system power ratings use the Active Answers Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls To drill down to calculators: - Click on: "ProLiant Servers" - Click on the Server of interest. Example: DL380 G4 Packaged Cluster - Click on: "Power Calculator" link. (You may need to scroll down to see it)	
	SCSI Connectors	One external VHDCI connector	
	Power Supply Output Power (per power supply)	Rated Steady-State Power	575W
		Maximum Peak Power	57W
	Temperature Range	Operating	50° to 95° F (10° to 35° C)
		Shipping	-22° to 122° F (-30° to 50° C)
	Relative Humidity (non-condensing)	Operating	10% to 90%
		Shipping	5% to 95%
	Maximum Wet Bulb Temperature	82.4° F (28° C)	
	Acoustic Noise	Idle (Fixed Disk Drives Spinning)	
		L WAd (BELS)	7.4
		L pAm (dBA)	58
		Operating (Random Seeks to Fixed Disks)	
		L WAd (BELS)	7.4
		L pAm (dBA)	58

Packaged Cluster	Dimensions	16 x 21 x 29 in (17.5 x 48.3 x 52.1 cm)	
	Weight	Standard Configuration (No drives dual power supplies)	190 lb (86.18 kg)

Technical Specifications

Low-Profile 24X Max IDE CD-ROM Drive	Disk	Applicable Disk	CD-DA, CD-ROM (Mode 1 and 2) CD-XA, CD-I (Mode 2, Form 1 and 2) CD-I Ready, CD Extra, Video CD, CD-Bridge Photo CD (Single and Multi-session) CD-WO
		Capacity	550 MB (Mode 1, 12 cm) 640 MB (Mode 2, 12 cm)
		Diameter	4.7 x 3.15 in (12 x 8 cm)
		Rotational Speed	4200 rpm maximum
		Center Hole	0.6 in (15 mm) diameter
		Thickness	1.2 mm
		Track Pitch	1.6 μm
	Block Size	Mode 0	2,368, 2,352 bytes
		Mode 1	2,352, 2,340, 2,336, 2,048 bytes
		Mode 2	2,352, 2,340, 2,336, 2,048 bytes
	Interface	IDE (ATAPI)	
	Access Times (typical)	Random	< 140 ms
		Full-Stroke	< 300 ms
	Data Transfer Rate	Sustained	150 KB/s (sustained 1X)
		Burst	2100 to 4800 KB/s
	Cache Buffer	128 KB	
	Start-up Time (typical)	< 10 seconds	
	Stop Time	< 5 seconds	
	Operating Conditions	Temperature	41° to 120° F (5° to 55° C)
		Humidity	10% to 80%
	Dimensions	(H x W x D, maximum)	0.51 x 5.24 x 5.2 in (1.30 x 13.31 x 13.21 cm)
		Weight	< 340 g

Technical Specifications

Integrated Smart Array 6i Plus Controller	Data Compatible with all Smart Array Controllers	Yes
	Instant Upgrades to other Smart Array Controllers	Yes
	Consistent Software Manageability Tools	Yes
	PCI-X Bus	64-bit, 133 MHz (integrated on system board)
	PCI-X Peak Data Transfer Rate	800 MB/s
	SCSI Protocols Supported	Ultra320, Ultra3, Ultra 2
	SCSI Peak Data Transfer Rate	320 MB/s per channel NOTE: For ProLiant servers having TWO internal drive bays on separate SCSI ports: SCSI Peak Data Transfer Rate is 320 MB/s total; 160 MB/s per channel and Channels is 2.
	Channels	2 NOTE: For ProLiant servers having two internal drive bays on separate SCSI ports: SCSI Peak Data Transfer Rate is 320 MB/s total; 160 MB/s per channel and Channels is 2.
	SCSI Ports (external/internal)	0/2 NOTE: For ProLiant servers having two internal drive bays on separate SCSI ports: SCSI Peak Data Transfer Rate is 320 MB/s total; 160 MB/s per channel and Channels is 2.
	Drives Supported (maximum)	Maximum = total number of drives NOTE: Maximum is the total number of internal drives on each specific ProLiant server.
	Cache	64 MB Read and/or Write Cache
	Battery-Backed Write Cache	Yes, with installation of Battery-Backed Write Cache Enabler, up to 64MB
	RAID Support	0, 1, 1+0, 5
	Logical Drives (maximum)	Maximum = total number of drives
	Online Configuration	Yes
	Online Capacity Expansion	Yes
	Logical Drive Capacity Extension	Yes
	Online Stripe Size Migration	Yes
	Online RAID Level Migration	Yes
	Online Spare Support	Yes
	Automatic Data Recovery	Yes
	Drive Roaming	Yes
	Redundant Controllers	No

Technical Specifications

Embedded NC7782 PCI-X Gigabit Server Adapter	Network Interface	10Base-T/100Base-TX/1000 BaseTX	
	Compatibility	IEEE 802.3/802.3u compliant	
	Data Transfer Method	64-bit bus-master PCI-X	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000 Mb/s
	Connector	RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		100Base-TX	Category 5 UTP; up to 328 ft (100 m)
		1000Base-TX	Category 5 UTP; up to 328 ft (100 m)

Modular Smart Array 1000	LED Indicators on Front (3)	Power	
		Fault detected in one or more sub-systems	
		Fault in Enclosure Management	
	LED Indicators for Drive Modules (3)	Drive Access (center)	
		Online (left)	
		Drive Failure (right)	
	LED Indicators on Rear Panel (4)	Power Supply/Blower Assembly Fault (1)	
		EMU (3) Power, A bus, B bus	
	Interface	Ultra3 SCSI to Hard Drives	
		2 Gb Fibre Channel to Hosts	
	Maximum Number of Drives	Fourteen, 1-inch HP Ultra2, Ultra3 or Ultra320 Universal Hard Drives (MSA1000 Cabinet); expandable to 42 using two additional HP StorageWorks 4200/4300 Enclosures	
	Temperature Range	Operating	50° to 95° F (10° to 35° C)
		Shipping	-22° to 122° F (-30° to 50° C)
		NOTE: Derated 1° C per 1,000 ft of elevation to 10,000 ft.	
	Relative Humidity	Operating	10% to 90%
		Non-operating	Up to 95%
	Input Power Requirements	Rated Input Voltage	100 to 240 VAC
		Rated Input Frequency	50 to 60 Hz
		Rated Input Current	6 A Max
		Input Power (max)	549 W*
	Heat Dissipation (max)	1876 Btu/hr*	
		NOTE: Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.	

Technical Specifications

	MSA1000 Cabinet	4U Rack Form Factor	
		Dimensions (H x W x D)	6.9 x 19 x 20.5 in (17.5 x 48.3 x 52.1 cm)
		Weight	Net 55 to 85 lb (24.95 to 38.56 kg)
	User Interface	Controller display with Status Indicators (2) and push buttons (4) on front of controller	
	Electrical Interface	LVD (Low Voltage Differential)	
	Protocol Support	Wide Ultra3 SCSI	
	SCSI Ports	4-channel: 2 internal, 2 external	
	Drives Supported	Up to 42 drives	
	Maximum Capacity	6TB (42 drives x 146 GB)	
	Logical Drives (LUN)	Up to 32 Logical Drives	
	Maximum Logical Drive size	2.0TB	
Modular Smart Array 1000 Controller 218231-B22	User Interface	Controller Display with Status Indicators (2) and Push Buttons (4) Status Indicators on front of Controller (16)	
	Electrical Interface	LVD (Low Voltage Differential)	
	Protocol Support	Wide Ultra3 SCSI (160 MB/s per channel)	
	SCSI Ports	4-channel: 2 external/2 Internal	
	Drives Supported	Up to 42 drives	
	Maximum Capacity	6.0 TB (42 drives x 146 GB)	
	Logical Drives	Up to 32 logical drives	
	RAID Support	RAID ADG (Advanced Data Guarding)	
		RAID 5 (Distributed Data Guarding)	
		RAID 1+0 (Striping & Mirroring)	
		RAID Support	
	Cache Memory	Up to 512 MB Read/Write (256 MB modules). If redundant controllers are used they must have equally configured cache	
		ECC protection, battery-backed, and removable	
		Standard as of November 19, 2002: 256 MB cache memory (single module)	
	Cache Batteries	Up to three days of redundant battery life, removable for easy replacement	
	Upgradeable Firmware	2 MB flashable ROM	
	Disk Drive and Enclosure Protocol Support	HP Ultra320, Ultra3, and Ultra2 SCSI 1-inch Universal drives	
	Temperature Range	Dimensions (L x W x D)	17 x 12.5 x 7.75 in (43.2 x 31.75 x 19.7 cm)
		Weight (Gross)	6 lb (2.72 kg)

Technical Specifications

MSA Fabric Switch 2/8 288247-B21	Performance	2.125 Gbit/sec line speed, full duplex ;1.063 Gbit/sec line speed, full duplex; Auto-sensing of 1 Gbit/sec and 2 Gbit/sec port speeds; optionally programmable to fixed port speed; Speed matching between 1 Gbit/sec and 2 Gbit/sec ports Aggregate bandwidth 64 Gbit/sec end to end Fabric latency <2.1 µsec with no contention, cut-through routing at 2 Gbit/sec	
	Interoperability (NOTE: Products listed may be discontinued.)	SAN Switch 2/8-EL, SAN Switch 2/16-EL, SAN Switch 2/32, SAN Switch 2/64, SAN Switch 8, SAN Switch 16, SAN Switch 8-EL, SAN Switch 16-EL, Integrated/32, Integrated/64	
	Switch bandwidth	32 Gbit/sec end to end	
	Maximum frame size	2112-byte payload	
	Port types	8 ports universal (one internal, seven external), FL_Port, F_Port, and E_Port; self-discovery based on switch type (U_Port)	
	Media types	Small form-factor pluggable (SFP) four included standard; short wavelength (SWL) up to .31 mi (500m), long wavelength (LWL) up to 21 mi (35 km); distance depends on fiber-optic cable and port speed	
	Classes of service	Class 2, Class 3, Class F (inter-switch frames)	
	Management access	10/100 Ethernet port (RJ-45); Serial port (RS-232)	
	Management	Advanced Web Tools included; Fabric Manager (optional) Management access In-band via Management Server.	
	Security	Fabric security for configuration management, SAN access, and authentication/authorization	
	Supported software	Telnet, SNMP, WEBTOOLS, Zoning, Fabric Watch, Extended Fabrics, Remote Switch, Trunking, Advanced Performance Monitoring	
	Fabric services	Simple Name Server, Registered State Change Notification (RSN), Alias Server (multicast); and Zoning, WEB TOOLS. Optional QuickLoop, Fabric Watch, Extended Fabrics, and Remote Switch, Trunking, Advanced Performance Monitoring	
	Diagnostics	Diagnostics POST and embedded online/offline diagnostics	
	Dimensions (H x Wx D)	SAN Switch 2/8: 7.75 x 12.5 x 17 in (19.68 x 31.75 x 43.18 cm)	
	Shipping	6 lb (2.72.kg)	
	Humidity range	5% to 85% non-condensing at 104° F (40° C)	
	Environment	Temperature — Operating	32° F to 104° F (0° C to 40° C)
		Temperature — Non-operating	-31° F to 147° F (-25° C to 70° C)
		Vibration — Operating	0.5 G p-p, 5-500 Hz
		Vibration — Non-operating	2.0 G p-p, 5-500 Hz
	Connector Type	LC	
	Protocol	SCSI, IP	
	Data Transfer Method	64-bit/66 MHz PCI	
	Maximum Transfer Rate	200 MB	
	Packaging	Dimensions (L x W x D)	11 x 8.5 x 3 in (27.9 x 21.6 x 7.6 cm)
		Weight (Gross)	1 lb (0.45 kg)

Technical Specifications

Multi-Mode Fibre Channel Cables Kits 218960-B21	Cable Type	LC-LC (2 Gb to 2 Gb connections) and LC-SC (2 Gb to 1 Gb connections) 50 Micron multi-mode Fiber	
	Available Cable Lengths	6.5 ft, 16.4 ft, and 49.2 ft (2 m, 5 m, and 15 m)	
	Packaging	**Dimensions** (L x W x D)	11.5 x 9 x 1.5 in (29.2 x 22.8 x 3.8 cm)
		Weight (Gross)	0.75 to 1 lb (0.34 to 0.45 kg)

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.